



**U. S. Department of Transportation  
Office of the Secretary  
of Transportation**

## **PROGRAM SOLICITATION**

### **Small Business Innovation Research Program**

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**Closing Date: May 1, 2007**

**DOT SBIR Program Office, RTV-1A  
U.S. DOT/RITA/VNTSC  
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# DOT PROGRAM SOLICITATION FOR SMALL BUSINESS INNOVATION RESEARCH

## I. PROGRAM DESCRIPTION

### A. Introduction

This solicitation for research proposals is issued by The United States Department of Transportation (DOT) pursuant to the Small Business Innovation Development Act of 1982, P.L. 97-219 (codified at 15 U.S.C. 638) as amended by the Small Business Innovation Research (SBIR) Program, Extension, P.L. 99-443 which extended the program through September 30, 1993. On October 28, 1992, through the Small Business Innovation Research and Development Act of 1992 (P.L. 102-564), Congress reauthorized and extended the SBIR program for another seven years (2000). Subsequently, on December 21, 2000, through the Small Business Reauthorization Act of 2000 (P.L. 106-554) Congress again reauthorized the SBIR program through September 30, 2008.

The SBIR program encourages small business concerns to engage in research or research and development (R/R&D) that has the potential for commercialization to meet Federal research or research and development objectives.

The purposes of the SBIR program are:

- (1) To stimulate technological innovation;
- (2) To use small business to meet Federal R/R&D needs;
- (3) To increase private sector commercialization of innovations derived from Federal R/R&D; and
- (4) To foster and encourage participation by minority and disadvantaged persons in technological innovation.

In consonance with the statutory obligations of the Act, the DOT has established a Small Business Innovation Research Program —hereinafter referred to as the DOT SBIR Program.

The purpose of this solicitation is to invite small businesses with their valuable resources and creative capabilities to submit innovative research proposals that address high priority requirements of the DOT.

### B. Three-Phase Program

The DOT SBIR Program is a three-phase process.

#### **THIS SOLICITATION IS FOR PHASE I PROPOSALS ONLY.**

**Phase I.** Phase I provides support for the conduct of feasibility-related experimental or theoretical research or R/R&D efforts on research topics as described herein. The dollar value of the proposal may be up to \$100,000 unless otherwise noted and the period of performance is generally six months. The basis for award will be the scientific and technical merit of the proposal and its relevance to DOT requirements and priorities. **Only awardees in Phase I are eligible to participate in Phase II which is by invitation only.**

**Phase II.** Phase II is the principal R/R&D effort having a period of performance of approximately two years with a dollar value of up to \$750,000 unless otherwise noted. DOT will accept Phase II proposals under the DOT SBIR Program only from firms which have previously received a DOT Phase I award. Phase II proposals must be prepared in accordance with guidelines provided by DOT to Phase I awardees receiving an invitation to submit a Phase II proposal. Phase II awards will be based on the results of Phase I efforts, technical merit, agency priority and commercial applications, and the availability of appropriated funds to support the Phase II effort. Special consideration may be given to proposals that have obtained commitments for follow-on funding from non-Federal sources for Phase III.

**Phase III.** SBIR Phase III award logically follows SBIR Phase II and may be a continuation of the work under Phase II or commercialization of the research under the previous SBIR phases. Like SBIR Phase II, the award process is exempted from FAR subpart 5.2 requirements. Only those vendors who were awarded both a SBIR Phase I and Phase II may receive a SBIR Phase III award. There is no limit on the performance period length or dollar value of a SBIR Phase III, and the small business size limits for Phase I and Phase II awards do not apply to SBIR Phase III awards.

Phase III is to be conducted by the small business with either:

- non-Federal funds to pursue commercial applications of R/R&D funded in Phases I and II, or
- non-SBIR Government funded contracts for continued research or products or processes intended for use by the United States Government.

### C. Eligibility

Each concern submitting a proposal must qualify as a small business at the time of award of Phase I and Phase II contracts. In addition, **the primary employment of the principal investigator must be with the small business firm at the time of contract award and during the conduct of the proposed research** unless otherwise approved by the Contracting Officer. Primary employment means that more than one-half of the principal investigator's time is spent with the small business. Also for both Phase I and Phase II, the R/R&D work must be performed in the United States. "United States" means the 50 states, the Territories and possessions of the United States, the Commonwealth of Puerto Rico, the Commonwealth of the Northern Mariana Islands, the Trust Territory of the Pacific Islands, and the District of Columbia.

All types of small business organizations may submit proposals, including high technology, R&D, manufacturing, and service firms. Companies with outstanding scientific or engineering competence in highly specialized product, process or service areas may wish to apply their expertise to the research topics in this solicitation through a laboratory prototype. Ideally, the research should make a significant contribution to the solution of an important transportation problem and provide the small business concern with the basis for new products, processes, or services.

### D. General Information

This is a solicitation for Phase I R/R&D proposals on advanced, innovative concepts from small business firms having strong capabilities in applied science or engineering.

The Phase I R/R&D proposals shall demonstrate a sound approach to the investigation of an important transportation-related scientific or engineering problem categorized under one of the topics listed in Section VIII.

A proposal may respond to any of the research topics listed in Section VIII, but must be limited to one topic. The same proposal may not be submitted under more than one topic. An organization may, however, submit separate proposals on different topics, or different proposals on the same topic, under this solicitation. Where similar research is discussed under more than one topic, the offeror shall choose that topic which appears to be most relevant to the offeror's technical concept.

The proposed research must have relevance to the improvement of some aspect of the national transportation system or to the enhancement of the ability of an operating element of the DOT to perform its mission.

Proposals shall be confined principally to scientific or engineering research, which may be carried out through construction and evaluation. Proposals must be for R/R&D, particularly on advanced or innovative concepts, and shall not be for incremental or scaled-up versions of existing equipment or the development of technically proven ideas. Proposals for the development of already proven concepts toward commercialization, or which offer approaches already developed to an advanced prototype stage or for market research shall not be submitted.

Commercialization is the objective of Phase III, in which private capital or non-SBIR funds are to be used to continue the innovative research supported by DOT under Phase I and Phase II.

The proposal shall be self-contained and checked carefully by the offeror to ensure that all preparation instructions have been followed.  
(See Proposal Checklist, Appendix D).

Requests for additional information or questions relating to the DOT SBIR Program may be addressed to:

Joseph Henebury  
DOT SBIR Program Director, RTV-1A  
U.S. DOT/RITA/VNTSC  
55 Broadway  
Cambridge, MA 02142-1093

Telephone: (617) 494-2051  
Fax: (617) 494-2370  
Email Address: henebury@volpe.dot.gov  
Volpe Center Website:  
<http://www.volpe.dot.gov/SBIR>

## II. DEFINITIONS

### A. Research or Research and Development (R/R&D)

R/R&D means any activity which is:

- (1) A systematic, intensive study directed toward greater knowledge or understanding of the subject studied;
- (2) A systematic study directed specifically toward applying new knowledge to meet a recognized need; or
- (3) A systematic application of knowledge toward the production of useful materials, devices, and systems or methods, including design, development, and improvement of prototypes and new processes to meet specific requirements.

### B. Small Business Concern

A small business concern is one that at the time of award of Phase I and Phase II contracts meets all of the following criteria:

- (1) Is independently owned and operated, is not dominant in the field of operation in which it is proposing, and has a place of business in the United States and operates primarily within the United States or makes a significant contribution to the U.S. economy, and is organized for profit.
- (2) Is (a) at least 51% owned and controlled by one or more individuals who are citizens of, or permanent resident aliens in, the United States or (b) it must be a for-profit business concern that is at least 51% owned and controlled by another for-profit business concern that is at least 51% owned and controlled by one or more individuals who are citizens of, or permanent resident aliens in, the United States.
- (3) Has, including its affiliates, an average number of employees for the preceding 12 months of less than 500, and meets the other regulatory requirements found in 13 CFR Part 121. Business concerns are generally considered to be affiliates of one another when either directly or indirectly, (a) one

concern controls or has the power to control the other; or (b) a third party/parties controls or has the power to control both.

Control can be exercised through common ownership, common management, and contractual relationships. The term "affiliates" is defined in greater detail in 13 CFR 121.103. The term "number of employees" is defined in 13 CFR 121.106.

A business concern may be in the form of an individual proprietorship, partnership, limited liability company, corporation, joint venture, association, trust, or cooperative. Further information may be obtained at <http://www.sba.gov/size>, or by contacting the Small Business Administration's Government Contracting Area Office or Office of Size Standards.

### C. Socially and Economically Disadvantaged Small Business Concern

A socially and economically disadvantaged small business concern is one that is at least 51% owned and controlled by one or more socially and economically disadvantaged individuals, or an Indian tribe, including Alaska Native Corporations (ANCs), a Native Hawaiian Organization (NHO), or a Community Development Corporation (CDC). Control includes both strategic planning (as that exercised by boards of directors) and the day-to-day management and administration of business operations. See 13 CFR 124.109, 124.110, and 124.111 for special rules pertaining to concerns owned by Indian Tribes (including ANCs), NHOs, or CDCs, respectively.

### D. Women-Owned Small Business Concern

A woman-owned small business concern is one that is at least 51% owned and controlled by a woman or women. Control includes both the strategic planning (as that exercised by boards of directors) and the day-to-day management and administration of business operations.

## **E. Veteran Owned Small Business**

A veteran-owned small business concerns is one that is at least 51 percent owned and controlled by one or more veterans (as defined at 38 U.S.C. 101(2) or, in the case of any publicly owned business, not less than 51 percent of the stock of which is owned by one or more veterans, and the management and daily business operations of which are controlled by one or more veterans.

## **F. Subcontract**

Subcontract means any agreement, other than one involving an employer-employee relationship, entered into by a Federal Government funding agreement awardee calling for supplies or services required solely for the performance of the original funding agreement.

## **G. Historically Underutilized Business Zone (HUBZone)**

- A HUBZone small business concern is one that meets the following criteria:
  - 1. Located in “historically underutilized business zone” or HUBZone area located in one or more of the following:
    - a) A qualified census tract (as defined in Section 42(d)(5)(i)(I) of the Internal Revenue Code of 1986);
    - b) A qualified “non–metropolitan county” (as defined in Section 143(k)(2)(B) of the Internal Revenue Code of 1986) with a median household income of less than 80% of the state median household income or with an unemployment of not less than 140% of the statewide average based on U.S. Department of Labor recent data; or
    - c) Lands within the boundaries of Federally recognized Indian reservations.
  - 2. Owned and controlled by one or more U.S. citizen(s).
  - 3. At least 35% of its employees must reside in a HUBZone.

### III. PROPOSAL PREPARATION INSTRUCTIONS AND REQUIREMENTS

#### A. Proposal Submission Requirements (NEW)

All proposals must be submitted via email to [henebury@volpe.dot.gov](mailto:henebury@volpe.dot.gov)

##### Electronic Submission Requirements:

To submit your proposal electronically, you must register at our website: <http://www.volpe.dot.gov/sbir> by April 17, 2007.

- Each proposal shall not exceed 25 pages (regular size type – no smaller than 10 point font size – single or double spaced, standard 8 ½” by 11” pages) including proposal cover sheet, contract pricing proposal, and all enclosures or attachments.
- Proposals must be a PDF file attached to email.
- No duplicate proposals shall be sent by any other means.
- Proposals must be sent via email to: [henebury@volpe.dot.gov](mailto:henebury@volpe.dot.gov).
- Proposals must be received no later than 5:00 p.m. EST on May 1, 2007.
- The proposal file name shall contain eight (8) characters—the first three shall be the topic number you are proposing to (i.e., FH3), and the remaining five characters shall be a unique abbreviation of your company’s name.

Your proposal will have the same protection/security as DOT email. It will be available to only the team of DOT engineers and/or scientists responsible for evaluating your proposal.

#### B. **Proposal Cover Sheet**

Complete the Proposal Cover Sheet in Appendix A as Page one of your proposal. All pages shall be numbered consecutively, beginning with the Proposal Cover Sheet.

#### C. **Project Summary**

Complete the form in Appendix B as Page two of your proposal. The Project Summary shall include a technical abstract with a brief statement of the problem or opportunity, project objectives, and description of the effort. Anticipated results and potential applications of the proposed research shall also be summarized in the space provided. The Project Summary of successful proposals may be published by the DOT and, therefore, shall not contain classified or proprietary information. The technical abstract must be limited to 200 words in the space provided on the Project Summary form.

#### D. **Technical Content**

Submitted proposals must include the following:

- (1) **Identification and Significance of the Problem or Opportunity.** The specific technical problem or innovative research opportunity addressed and its potential benefit to the national transportation system shall be clearly stated.
- (2) **Phase I Technical Objectives.** State the specific objectives of the Phase I R/R&D effort, including the technical questions it will try to answer to determine the feasibility of the proposed approach.
- (3) **Phase I Work Plan.** Describe the Phase I R/R&D plan. The plan shall indicate what will be done, where it will be done, and how the R/R&D will be managed or directed and carried out. Phase I R/R&D shall address the objectives and the questions cited in (2) above. The methods planned to achieve each objective or task shall be discussed in detail, including the level of effort associated with each task.
- (4) **Related Research or R&D.** Describe significant R/R&D that is directly related to the proposal including any conducted by the project manager/principal investigator or by the proposing firm. Describe how it relates to the proposed effort, and any planned coordination with outside sources. The offeror must persuade reviewers of his or her

awareness of key recent R/R&D conducted by others in the specific topic area.

- (5) **Key Personnel and Bibliography of Directly Related Work.** Identify key personnel involved in Phase I including their directly related education, experience, and bibliographic information. Where vitae are extensive, summaries that focus on the most relevant experience or publications are desired and may be necessary to meet proposal page limitations.
- (6) **Relationship with Future Research and Development.**
  - (a) State the anticipated results of the proposed approach if the project is successful (Phase I and Phase II).
  - (b) Discuss the significance of the Phase I effort in providing a foundation for Phase II R/R&D effort.
- (7) **Facilities.** Provide a detailed description, availability and location of instrumentation and physical facilities proposed for Phase I.
- (8) **Consultants.** Involvement of consultants in the planning and research stages of the project is permitted. If such involvement is intended, it shall be described in detail.
- (9) **Potential Applications.** Briefly describe:
  - (a) Whether and by what means the proposed project appears to have potential commercial application.
  - (b) Whether and by what means the proposed project appears to have potential use by the Federal Government.
- (10) **Similar Proposals or Awards.** Warning — while it is permissible, with proposal notification, to submit identical proposals or proposals containing a significant amount of essentially equivalent work for consideration under numerous Federal program solicitations, it is unlawful to enter into contracts or grants requiring essentially equivalent effort. If there is any question concerning this, it must be disclosed to the soliciting agency or agencies before award.

If a firm elects to submit identical proposals or proposals containing a significant amount of essentially equivalent work under other Federal program solicitations, a statement must be included in each such proposal indicating:

- (a) The name and address of the agencies to which proposals were submitted or from which awards were received;
- (b) Date of proposal submission or date of award;
- (c) Title, number, and date of SBIR Program solicitations under which proposals were submitted or awards received;
- (d) The applicable research topics for each SBIR proposal submitted or award received;
- (e) Titles of research projects; and
- (f) Name and title of Project Manager or Principal Investigator for each proposal submitted or award received.

#### **E. Contract Pricing Proposal**

A firm fixed price Phase I Contract Pricing Proposal (Schedule 1) must be submitted in detail as shown in Appendix C. Note: firm fixed price is the type of contract to be used for Phase I SBIR awards. Some cost breakdown items of Appendix C may not apply to the proposed project. If such is the case, there is no need to provide information for each and every item. It is important, however, to provide enough information to allow the DOT to understand how the offeror plans to use the requested funds if the contract is awarded. Phase I contract awards may include profit.

#### **F. Central Contracting Registration (CCR) and Data Universal Numbering System (DUNS) Identification Number**

Since October 1, 2003, it is federally mandated that any business wishing to do business with the Federal Government under a Federal Acquisition Regulation (FAR)-based contract must be registered in CCR before being awarded a contract. You can find more information on CCR and the registration process in their handbook, <http://www.ccr.gov/handbook.asp>. You can register online at <http://www.ccr.gov> by



clicking on “Start New Registration” if you already have a DUNS number. If you need a DUNS number, you can find instructions at <http://www.ccr.gov/vendor.asp#5a>.

A firm must note its DUNS identification number on Appendix C, Contract Pricing Proposal, Schedule 1. This number is assigned by Dun & Bradstreet, Inc.

**G. Acknowledgement of Proposal Receipt**

Offerors shall fill out the Proposal Acknowledgement Form (Appendix E) and include it with the proposal to DOT.

**H. Prior SBIR Phase II Awards**

If the small business concern has received more than 15 Phase II awards in the prior five fiscal years, submit name of awarding agency, date of award, funding agreement number, amount, topic or subtopic title, follow-on agreement amount, source and date of commitment, and current commercialization status for each Phase II. (This required proposal information shall not be counted toward the proposal 25-page count limitation.)

## IV. METHOD OF SELECTION AND EVALUATION CRITERIA

### A. General

All Phase I and Phase II proposals will be evaluated and judged on a competitive basis. Initially, all proposals will be screened to determine responsiveness to the solicitation. Proposals passing this screening will be evaluated to determine the most promising technical and scientific approaches. Each proposal will be judged on its own merit. The DOT is under no obligation to fund any proposal or any specific number of proposals on a given topic or subtopic. It may elect to fund several or none of the proposed approaches to the same topic or subtopic.

### B. Evaluation Criteria

The evaluation process involves the following factors:

- (1) Scientific and technical merit and the feasibility of the proposal's commercial potential, as evidenced by:
  - a) Past record of successful commercialization of SBIR or other research;
  - b) Existence of Phase III funding commitments from private sector or non-SBIR funding sources; and
  - c) Presence of other indicators of the commercial potential of the idea.
- (2) The adequacy of the work plan and approach to achieve specified work tasks and stated objectives of the proposed effort within budgetary constraints and on a timely schedule.
- (3) Qualifications of the proposed principal/key investigator(s) including demonstrated expertise in a disciplinary field related to the particular R/R&D topic that is proposed for investigation.
- (4) Adequacy of supporting staff and facilities, equipment, and data for the successful completion of the proposed R/R&D.

### C. Prescreening

Each proposal submission will be examined to determine if it is complete and contains adequate technical and pricing data. Proposals that do not meet the basic requirements of the solicitation will be excluded from further consideration. Each offeror will be notified promptly by letter of such action.

### D. Schedule

All DOT reviews shall be completed and awards recommended within five months of the closing date for Phase I proposals.

### E. Program Selection

A Proposal Review Panel, chaired by the DOT SBIR Program Director and comprising senior management officials representing the Department's Operating Administrations and the Office of the Secretary, will arrange for review and evaluation of proposals by professionals, in their respective organizations, of all Phase I proposals that meet the requirements of this solicitation. The Proposal Review Panel will review the technical evaluations by the engineers and/or scientists and recommend to the DOT SBIR Program Director the proposals for awards. The DOT SBIR Program Director will announce the awards.

### F. Contact with DOT

Contact with DOT relative to this solicitation during the Phase I proposal preparation and evaluation period is restricted for reasons of competitive fairness. Technical questions pertaining to the 2007 DOT SBIR solicitation research topics must be submitted to the DOT SBIR Program Office by e-mail to: [henebury@volpe.dot.gov](mailto:henebury@volpe.dot.gov). Technical questions will be researched and answers provided in as timely a manner as possible. Technical questions submitted to the DOT SBIR Program Office during the few weeks prior to the closing date for receipt of Phase I proposals may not be able to be answered before the closing date.

No information on proposal status will be available until the complete list of 2007 Phase I Award Recommendations is posted on the DOT SBIR

Program Webpage: <http://www.volpe.dot.gov/sbir>.  
For planning purposes the notification of 2007 Phase I Award Recommendations is expected to be posted on the DOT SBIR Program Webpage by October 1, 2007. **Phase I proposals which are not included in the October 1 list of 2007 Phase I Award Recommendations will not receive an award. NO WRITTEN CORRESPONDENCE REGARDING PROPOSAL STATUS WILL BE ANSWERED.**

After the 2007 Phase I Award Recommendations are posted on the DOT SBIR Program Webpage, a debriefing comprised of the overall comments on the proposal may be provided to the offeror upon request.

Debriefing requests should be submitted to the Contracting Officer by e-mail to: [Orin.D.Cook@volpe.dot.gov](mailto:Orin.D.Cook@volpe.dot.gov), and must include the offeror's name, address, research topic number, and the proposal identification number assigned on the acknowledgement of receipt card. The identity of the evaluators will not be disclosed.

## V. CONSIDERATIONS

### A. Awards

It is estimated that during Fiscal Year 2007, DOT will award approximately 19 Phase I contracts with an anticipated potential maximum of 20 awards, depending on actual funding available and the responses from small business firms to the solicited research topics in Section VIII.

All Phase I awards will be firm fixed price contracts and may be up to \$100,000 each unless otherwise noted. Phase II awards anticipate cost-plus-fixed-fee contracts with a value of up to \$750,000 each unless otherwise noted. Phase II awardees will be required to have an acceptable accounting system to receive a cost-plus-fixed-fee contract.

Only recipients of Phase I contracts will be eligible to compete for Phase II awards.

DOT's Operating Administrations contribute to SBIR funding. Each Operating Administration's contribution may be used only to support research of concern to that Operating Administration. For example, funds furnished by the Federal Highway Administration may not support research solely of concern to the National Highway Traffic Safety Administration. Based on anticipated funding levels, there may not be adequate funding within the DOT SBIR Program to support Phase I and/or Phase II awards for research which is solely of concern to the following Operating Administrations: Federal Aviation Administration, Federal Highway Administration, Federal Motor Carrier Safety Administration, Federal Railroad Administration, Federal Transit Administration, National Highway Traffic Safety Administration, Research and Innovative Technology Administration, and Pipeline Hazardous Materials Safety Administration. Phase I and Phase II awards for such research will depend on the actual funding available.

### B. Reports

Under Phase I SBIR contracts, three reports will be required, consisting of two interim letter reports, and a comprehensive final report.

### C. Payment Schedule

Payments for Phase I contracts will be made in three equal installments upon submission of invoices by the

contractor in conjunction with the submission of acceptable reports as described in Paragraph B above.

### D. Innovations, Inventions, and Patents

1. **Proprietary Information.** Information contained in unsuccessful proposals will remain the property of the offeror. The Government may, however, retain copies of all proposals. Public release of information in any proposal submitted will be subject to existing statutory and regulatory requirements.

If proprietary information is provided by a offeror in a proposal which constitutes a trade secret, proprietary commercial or financial information, confidential personal information or data affecting national security, it will be treated in confidence, to the extent permitted by law, provided this information is clearly marked by the offeror with the term "confidential proprietary information" and provided the following legend appears on the title page of the proposal:

"For any purpose other than to evaluate the proposal, these data shall not be disclosed outside the Government and shall not be duplicated, used, or disclosed in whole or in part, provided that if a contract is awarded to this offeror as a result of or in connection with the submission of these data, the Government shall have the right to duplicate, use, or disclose the data to the extent provided in the contract. This restriction does not limit the Government's right to use information contained in the data if obtained from another source without restriction. The data subject to this restriction is contained pages \_\_\_\_\_ of this proposal."

Any other legend may be unacceptable to the Government and may constitute grounds for return of the proposal without further consideration and without assuming any liability for inadvertent disclosure. The Government will limit dissemination of such information to within official channels.

DOT prefers that offerors avoid inclusion of proprietary data in their proposals. If the inclusion of proprietary data is considered essential for meaningful evaluation of a proposal submission, then such data should be

provided on a separate page with a numbering system to key it to the appropriate place in the proposal.

2. **Rights in Data Developed under SBIR Contracts.** Rights in technical data, including software developed under any contract resulting from this solicitation, shall remain with the contractor except that the Government shall have the limited right to use such data for Government purposes and shall not release such data outside the Government without permission of the contractor for a period of four years from completion of the project from which the data were generated. However, effective at the conclusion of the four-year period, the Government shall retain a royalty-free license for Federal Government use of any technical data delivered under an SBIR contract whether patented or not.
3. **Copyrights.** With prior written permission of the Contracting Officer, the contractor normally may copyright and publish (consistent with appropriate national security considerations, if any) material developed with DOT support. The DOT receives a royalty-free license for the Federal Government and requires that each publication contain an appropriate acknowledgement and disclaimer statement.
4. **Patents.** Small business firms normally may retain the principal worldwide patent rights to any invention developed with Government support. The Government receives a royalty-free license for Federal Government use, reserves the right to require the patent holder to license others in certain circumstances, and requires that anyone exclusively licensed to sell the invention in the United States must normally manufacture it domestically. To the extent authorized by 35 U.S.C. 205, the Government will not make public any information disclosing a Government-supported invention for a two-year period to allow the contractor a reasonable time to pursue a patent.

#### **E. Cost-Sharing**

Cost-sharing is permitted for Phase II proposals under the topic areas identified in this solicitation; however, cost-sharing is not required nor will it be a factor in proposal evaluations.

#### **F. Profit or Fee**

A profit is allowed on awards to small business concerns under the DOT SBIR Program.

#### **G. Joint Ventures or Limited Partnerships**

Joint ventures and limited partnerships are permitted provided the entity created qualifies as a small business concern in accordance with the Small Business Act, 15 U.S.C. 631, and the definition included in this solicitation.

#### **H. Research and Analytical Work**

1. **For Phase I, a minimum of two-thirds of the research and/or analytical effort must be performed by the proposing firm** unless otherwise approved in writing by the Contracting Officer.
2. **For Phase II, a minimum of one-half of the research and/or analytical effort must be performed by the proposing firm** unless otherwise approved in writing by the Contracting Officer.

#### **I. Contractor Commitments**

Upon award of a contract, the awardee will be required to make certain legal commitments through acceptance of numerous contract clauses. The outline that follows is illustrative of the types of clauses to which the contractor would be committed. This list shall not be understood to represent a complete list of clauses to be included in Phase I contracts, nor to be the specific wording of such clauses. A complete copy of the terms and conditions will be provided upon issuance of the model contract for signature prior to award.

1. **Standards of Work.** Work performed under the contract must conform to high professional standards.
2. **Inspection.** Work performed under the contract is subject to Government inspection and evaluation at all times.
3. **Examination of Records.** The Comptroller General (or a duly authorized representative) shall have the right to examine any directly pertinent records of the contractor involving transactions related to this contract.

4. **Default.** The Government may terminate the contract if the contractor fails to perform the work contracted.
  5. **Termination for Convenience.** The contract may be terminated at any time by the Government if it deems termination to be in its best interest, in which case the contractor will be compensated for work performed and for reasonable termination costs.
  6. **Disputes.** Any dispute concerning the contract which cannot be resolved by agreement shall be decided by the Contracting Officer with right of appeal.
  7. **Contract Work Hours.** The contractor may not require an employee to work more than eight hours a day or 40 hours a week unless the employee is compensated accordingly (i.e., overtime pay).
  8. **Equal Opportunity.** The contractor will not discriminate against any employee or applicant for employment because of race, color, religion, sex, or national origin.
  9. **Affirmative Action for Veterans.** The contractor will not discriminate against any employee or applicant for employment because he or she is a disabled veteran or veteran of the Vietnam era.
  10. **Affirmative Action for Handicapped.** The contractor will not discriminate against any employee or applicant for employment because he or she is physically or mentally handicapped.
  11. **Officials Not to Benefit.** No member of or delegate to Congress shall benefit from the contract.
  12. **Covenant Against Contingent Fees.** No person or agency has been employed to solicit or secure the contract upon an understanding for compensation except bonafide employees or commercial agencies maintained by the contractor for the purpose of securing business.
  13. **Gratuities.** The contract may be terminated by the Government if any gratuities have been offered to any representative of the Government to secure the contract.
  14. **Patent Infringement.** The contractor shall report each notice or claim of patent infringement based on the performance of the contract.
  15. **Procurement Integrity.** Submission of a proposal under this solicitation subjects the offeror to the procurement integrity provision (§27) of the Office of Federal Procurement Policy Act (41 U.S.C. 423). This statute, as implemented by Federal Acquisition Regulation (FAR, 48 CFR) §3.104, prescribes the following conduct by competing contractors during an agency procurement: offering or discussing future employment or business opportunities with an agency procurement official; promising or offering a gratuity to an agency procurement official; and/or soliciting or obtaining proprietary or source selection information regarding the procurement. Violations of the statute may result in criminal and/or civil penalties, disqualification of a offeror, cancellation of the procurement, or other appropriate remedy.
  16. **Section 508 Access Board Standards.** All electronic and information technology deliverables rendered must comply with Section 508 of the Rehabilitation Act and the Access Board Standards available for viewing at <http://www.section508.gov>. Unless otherwise indicated, the contractor represents by signature on a contract that all deliverables will comply with the Access Board Standards.
- J. Additional Information**
1. This solicitation is intended for informational purposes and reflects current planning. If there is any inconsistency between the information contained herein and the terms of any resulting SBIR contract, the terms of the contract are controlling.
  2. Before award of an SBIR contract, the Government may request the offeror to submit certain organizational, management, personnel, and financial information to assure responsibility of the offeror.
  3. The Government is not responsible for any monies expended by the offeror before award of any contract.

4. This solicitation is not an offer by the Government and does not obligate the Government to make any specific number of awards. Also, awards under this program are contingent upon the availability of funds.
5. The DOT SBIR Program is not a substitute for existing unsolicited proposal mechanisms. Unsolicited proposals shall not be accepted under the DOT SBIR Program in either Phase I or Phase II. See <http://www.volpe.dot.gov/procure/unsolguide.html> for specifics on unsolicited proposal submission requirements.
6. If an award is made pursuant to a proposal submitted under this solicitation, the contractor will be required to certify that he or she has not previously been, nor is currently being paid for essentially equivalent work by any agency of the Federal Government.
7. When purchasing equipment or a product with funds provided under the DOT SBIR Program, purchase only American made equipment and products, to the extent possible in keeping with the overall purposes of the program.
8. In accordance with FAR 52.233-2, Service of Protest, the following Service of Protest procedures shall be followed. Protests, as defined in Section 33.101 of the FAR that are filed directly with an agency, and copies of any protests that are filed with the Government Accountability Office (GAO), shall be served on the Contracting Officer (addressed as follows) by obtaining written and dated acknowledgement of receipt from: Orin Cook, DOT/RITA/Volpe Center, 55 Broadway, RTV-6D1, Cambridge, MA 02142-1093

## VI. SUBMISSION OF PROPOSALS

### A. Submittal Instructions

#### Electronic Submission Requirements:

- Each proposal shall not exceed 25 pages (regular size type – no smaller than 10 point font size – single or double spaced, standard 8 ½" by 11") including proposal cover sheet, contract pricing proposal, and all enclosures or attachments.
- Proposals must be a PDF file attached to e-mail.
- No duplicate proposals shall be sent by any other means.
- Proposals must be sent via e-mail to:  
[henebury@volpe.dot.gov](mailto:henebury@volpe.dot.gov).
- Proposals must be received no later than 5:00 p.m. EST on May 1, 2007.

- The proposal file name shall contain eight (8) characters - the first three shall be the topic number you are proposing to (i.e., FH3), and the remaining five characters shall be a unique abbreviation of your company's name.

Your proposal will have the same protection/security as DOT e-mail. It will be available to only the team of DOT engineers and/or scientists responsible for evaluating your proposal.

**You must register at our website to submit your proposal electronically:** <http://www.volpe.dot.gov/sbir> by April 17, 2007.

*Offerors will receive their proposal number via e-mail no later than May 31, 2007.*



## **VII. SCIENTIFIC AND TECHNICAL INFORMATION SOURCES**

The following organizations may be sources for providing technology search and/or document services and may be contacted directly for service and cost information:

Center for Technology Commercialization  
1400 Computer Drive  
Westborough, MA 01581  
(508) 870-0042

Federal Information Exchange, Inc.  
555 Quince Orchard Road, Suite 360  
Gaithersburg, MD 20878  
(301) 975-0103

Midcontinent Technology Transfer Center  
Texas Engineering Extension Service  
The Texas A&M University System  
301 Tarrow Street, Suite 119  
College Station, TX 77840-7896  
(409) 845-8762

MidAtlantic Technology Applications Center  
University of Pittsburgh  
3400 Forbes Avenue, 5<sup>th</sup> Floor  
Pittsburgh, PA 15260  
(412) 383-2500

Great Lakes Industrial Technology Center  
25000 Great Northern Corporation Center, Suite 260  
Cleveland, OH 44070-5320  
(440) 734-0094

Southern Technology Applications Center  
University of Florida  
1900 SW 34<sup>th</sup> Street, Suite 206  
Gainesville, FL 32608  
(352) 294-7822

National Technical Information Service  
5285 Port Royal Road  
Springfield, VA 22161  
(800) 553-6847

Technology Transfer Center  
University of Southern California  
3716 South Hope Street, Suite 200  
Los Angeles, CA 90007-4344  
(213) 743-2352

## VIII. RESEARCH TOPICS

Phase I research topics for DOT Operating Administrations are listed below. These topics indicate the specific areas for which proposals are to be considered for acceptance by DOT. The topics are not listed in any order of priority. Each proposal must respond to one (and only one) topic as described in this section. A proposal may, however, indicate and describe its relevance to other topics.

DOT OPERATING ADMINISTRATION/TOPIC	POTENTIAL MAXIMUM FY07 AWARDS
<b>FEDERAL HIGHWAY ADMINISTRATION</b>	<b>4 AWARDS</b>
<sup>1</sup> 07-FH1 DPS Receiver/Demodulator with Location Determination by Time/Phase Difference of Arrival	
07-FH2 Time-Resolved Microwave Thermoreflectometry for Corrosion Detection in Concrete	
<sup>2</sup> 07-FH3 Tools to Improve Real-Time Highway Construction Quality Control	
<sup>3</sup> 07-FH4 Quick Highway Incident Detection and Incident Warning Systems	
<b>FEDERAL MOTOR CARRIER SAFETY ADMINISTRATION</b>	<b>1 AWARD</b>
<sup>4</sup> 07-FM1 Safety Belt Devise or Technology to Increase Usage by Commercial Motor Vehicle Drivers and their Passengers	
<b>PIPELINE AND HAZARDOUS MATERIALS SAFETY ADMINISTRATION</b>	<b>4 AWARDS</b>
07-PH1 Pipeline Safety: <ol style="list-style-type: none"> <li>1. Nanotechnology tools for Internal Corrosion of Pipelines</li> <li>2. Development of Risk Protocol for LNG Facilities</li> <li>3. Design Optimization for Soft Crack Arrestors</li> </ol>	
07-PH2 Hazardous materials <ol style="list-style-type: none"> <li>1. Emerging Technologies Applicable to Hazardous Materials Transportation</li> </ol>	
<b>NATIONAL HIGHWAY AND TRAFFIC SAFETY ADMINISTRATION</b>	<b>2 AWARDS</b>
<sup>5</sup> 07-NH1 Development of Consolidated Six-Degree-of-Freedom Kinematics Sensor Array for Impact Testing	
<sup>5</sup> 07-NH2 Non Contact Roof Measurement System for Use in Dynamic Rollover Testing	

<sup>1</sup> Phase I may be up to \$100,000 and Phase II \$375,000

<sup>2</sup> Phase I may be up to \$100,000 and Phase II \$720,000

<sup>3</sup> Phase I may be up to \$100,000 and Phase II \$700,000

<sup>4</sup> Phase I may be up to \$100,000 and Phase II \$300,000 to \$500,000

<sup>5</sup> Phase I may be up to \$100,000 and Phase II \$300,000

## **FEDERAL TRANSIT ADMINISTRATION**

**5 AWARDS**

<sup>6</sup>07-FT1 Linear Induction Motors (LIM) Door Closer for Rapid Rail Vehicles

<sup>6</sup>07-FT2 Hybrid Propulsion for Rail Locomotives

<sup>6</sup>07-FT3 Methods for Upgrading Existing Automatic Train Control (ATC) Systems

<sup>6</sup>07-FT4 Very High Speed Third Rail Insulator Cleaning

<sup>6</sup>07-FT5 Better/Faster Braking Systems

## **FEDERAL RAILROAD ADMINISTRATION**

**3 AWARDS**

<sup>7</sup>07-FR1 Locking Mechanism for Rotating Seats

<sup>7</sup>07-FR2 Quick-release Emergency Egress Panel on Cab Car End Doors

<sup>7</sup>07-FR3 Continued Communication Capability in the Event of a Train-line Break in Passenger Train

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<sup>6</sup> Phase I may be up to \$100,00 and Phase II \$500,000

<sup>7</sup> Phase I may be up to \$75,000 and Phase II \$250,000

**<sup>1</sup>07-FH1 DGPS Receiver/Demodulator with Location Determination by Time/Phase Difference of Arrival**

The U.S. Department of Transportation is developing an infrastructure based Differential Global Positioning System (DGPS) service that can provide navigation solutions independent of GPS. The need for this is evident in the U.S. Department of Homeland Security's analysis of critical infrastructure. The identification of backup systems in the event of a catastrophic system failure in GPS is needed to ensure minimal loss of safety and efficiency. While it is generally agreed that a catastrophic failure of GPS is not a likely scenario, loss of signal over a geographic area is considered possible. Alternatives have focused on meeting the requirement for a backup system through low cost services and procedures. The DGPS service under development by the Federal Highway Administration has the potential to serve as a backup system, offering similar accuracy, availability, and integrity that will be needed to maintain safety and efficiency in the event that GPS is lost.

Some theoretical work has been done to evaluate the concept offered by DGPS service, but there has been no formal effort to either assess the capability or develop hardware capable of making use of the new signal.

Functionally, the DGPS broadcast uses GPS to synchronize the carrier as well as the symbol/bit timing in two separate frequency bands. In the 285-325 kHz band, data is broadcast at 100 or 200 bps (using MSK modulation) and in the 435-495 kHz band, data is broadcast at 1000 bps (using Raised Cosine MSK). The existing specification calls for the synchronization of the carrier to be better than 0.005%. This can be improved in order to offer improved performance, but it is unclear how much improvement is needed. The primary goal of this phase is to develop a full understanding of the linkage between the various aspects of the system to include but not be limited to accuracy available, effects of improving accuracy on broadcast cost, complexity of a receiver/demodulator, and effects of external parameters on accuracy (such as non-linear propagation characteristics over short/long baselines and phase center of the broadcast antenna).

In order to evaluate/analyze these factors, a demodulator/receiver capable of demodulating the DGPS data and identifying the phase/time difference of arrival of the two broadcasts from at least three and preferably four independent broadcast facilities is needed. In this first phase, it is envisioned that most of this can be achieved with analog to digital converters, digital signal processing, and a laptop computer. Phase II will require the development of dedicated hardware.

**Relationship to FHWA Strategic Objectives**

This work directly supports several strategic goals including National Security, Safety, Global Connectivity, and Mobility. Specifically, this effort supports infrastructure mapping, vehicle navigation, rural intersection collision avoidance where sufficient infrastructure is unavailable and not planned for the foreseeable future, and backup capability for critical infrastructure.

**07-FH2 Time-Resolved Microwave Thermorefectometry for Corrosion Detection in Concrete**

Corrosion of steel reinforcements in concrete is a major problem for the transportation infrastructure. Conventional methods for detecting corrosion are based on electro-chemical techniques such as half-cell potential and linear polarization. These can be affected by a number of factors and require direct contact with the concrete. A non-contact method that does not rely on electrochemistry has been proposed by Chang et al.(1). This is based on the principle that a corrosion layer surrounding the steel

bar serves as a thermal insulator. Therefore, a corroded steel bar that has been heated above ambient temperature will cool down more slowly than an uncorroded one, and the difference in rate of cooling can be used to detect the corrosion. The rebar can be heated in the concrete by using an AC electrical induction heater external to the concrete structure. The temperature at the surface of the rebar can be detected nondestructively by the reflectance of a microwave beam, since the reflectivity is temperature dependent. The induction heater can be cycled on and off to produce temperature pulses in the rebar, and thus the heating and cooling can be cycled repeatedly. By scanning the microwave beam over the rebar, it is possible to image the corrosion layer. More recently, a microwave beam array camera has been developed that can permit more rapid and focused image acquisition (2).

Phase I of the project would consist of acquiring the components of the system and evaluating the performance of the technique in the laboratory on corroded steel in concrete test specimens. This research would establish the optimum operating parameters in terms of induction heater frequency and cycle time, microwave frequency etc. and specifications for a prototype system. Phase II would consist of field tests leading refinements to the instrument design and demonstrations for commercialization.

Offeror should have demonstrated technology for microwave inspection of concrete.

- (1) Spicer, J.W.M., R. Osiander and L.C. Aamodt (1998). Microwave thermo-reflectometry for detection of rebar corrosion. Structural Materials Technology III: An NDT Conference, San Diego, SPIE: 402-409.
- (2) Feng, M. and Y.J. Kim (2004). NDE of Concrete Structures Using Microwaves. Structural Materials and Technology VI-An NDT Conference, Buffalo, NY, American Society for Nondestructive Testing: 374-380.

### **Relationship to FHWA Strategic Objectives**

By providing early and accurate indication of corrosion, this technology would enable more effective repair or replacement of concrete thereby addressing the FHWA Strategic Objectives of improved mobility and safety.

### **<sup>2</sup>07-FH3 Tools to Improve Real-Time Highway Construction Quality Control**

An important focus of FHWA's vision of the future is long-life pavements and structures. Improved performance of pavements and structures will occur in part through improved quality control of materials and construction. Technology innovations in production, transport, placement, real-time quality control, and automation have been introduced over the years. Significant research has been implemented to address real-time quality control. The real-time quality control provides project field personnel the necessary information to make timely corrections/adjustments and reduce materials and construction variability.

The focus of the SBIR solicitation is on further enhancing real-time quality control. For concrete pavements and structures, a need exists for improved devices or systems that provide real-time measures of quality characteristics/properties such as durability, segregation, thickness, smoothness, curing effectiveness, moisture loss, consolidation, surface texture, steel cover and location, strength, water-cementitious ratio, etc. For asphalt pavements, a need exists for improved devices or systems that provide measures of several of the above plus others such as asphalt content, volumetric properties, etc. Some potential nondestructive testing technologies that could be applied or further developed, either individually or in combination, are infrared thermography, electromagnetic sounding, acoustic techniques, X-ray computed tomography (XCT), and magnetic tomography, to

name but a few. The use of embedded electronics, i.e., “smart” materials, can also be considered to allow improved detection/measurement with any of the technologies.

The offeror’s proposal can address real-time quality control for one or more quality characteristics. Ideally, the proposed tool could be used by the contractor for real-time quality control purposes and by the agency in assisting real-time predictions of future performance in an integrated intelligent paving system. Proposals will be evaluated in part on the anticipated potential benefits over current quality control/quality assurance practices.

### **Relationship to FHWA Strategic Objectives**

This research relates to FHWA’s strategic goals of Mobility, Productivity, and/or Safety. Under Mobility, it addresses the strategic objective of preserving and enhancing the highway infrastructure. Under productivity, it is aimed at improving the return on investment of the highway system. Under Safety, it has the potential to reduce job-site accidents.

### **<sup>3</sup>07-FH4 Quick Highway Incident Detection and Incident Warning Systems**

Highway incidents have been a major cause of highway congestion (for example, up to 75% of delays on freeways are caused by incidents), and also a major source for secondary crashes, due to slowed or stopped traffic.

However, due to the constraints in deployment cost, many existing incident detection and warning systems, deployed by DOTs and local traffic agencies, are not effective for early detection and quick response. Therefore, the performance of the systems has not been effective on reducing delays and avoiding secondary crashes caused by incidents.

One of the major reasons of the ineffectiveness is the spacing of the devices. Normally, detection stations and dynamic warning signs are placed with the intervals about ¼ to one mile. When an incident occurs, the existing incident algorithms have to wait until traffic backs up to the adjacent upstream detection stations before an incident is detected. In practice, five to seven minutes on average are needed to detect an incident, which would cause miles of backups and long delay. And such slow detection and warning systems could not prevent secondary crashes.

In this proposal, a new incident detection and warning system is proposed to address the issues. The basic concept is to use multiple low-cost detection stations with very small intervals. Also low-cost wireless communication devices and LED signs can be co-installed with each detection station. Since the stations are close to each other, it is feasible to detect and locate an incident very quickly, and also to use the LED signs to warn drivers to prevent secondary crashes. Low-cost wireless short-range communications can also be established through relaying from one station to another.

The proposed system uses low-cost speed sensors spaced at 100 feet or less. Sensors spaced at such intervals could detect changes in vehicle speeds and track each vehicle and the speed differentials between them. As a result the system could quickly determine incident scenarios and provide warnings to upstream traffic using LED flashers preventing secondary crashes.

(For detailed description, go <http://www.volpe.dot.gov/sbir/sol07/docs/07-fh4-attachment.doc>)

**407-FM1 Safety Belt Device or Technology to Increase Usage by Commercial Motor Vehicle Drivers and Their Passengers**

FMCSA research has shown that drivers of about 59% of commercial motor vehicles (those weighing 10,000 pounds or more that operate in interstate commerce) buckle their safety belts as compared to about 82% of passenger vehicle drivers. Increasing safety belt usage by CMV drivers is an FMCSA and DOT priority. It is envisioned that this device or technology will be low cost, reliable, comfortable, rugged and user-friendly, to increase comfort and/or encourage safety belt usage by CMV drivers and their passengers. Interlock devices or technologies that prevent the vehicle from moving or the radio from playing until the driver and their passenger are buckled will also be considered. Additional examples of potential concepts, if they do not already currently exist for CMV's as discussed below could include safety belt attachments such as uniquely designed pads or cushions, or electronic monitors in connection with on-board recorders. Ideas such as window stickers or similar decals to remind a driver to buckle up will not be considered for this program. **Offerors are strongly encouraged to conduct a thorough literature and patent search to assure their ideas are not currently available and/or patent protected. In addition, the offeror shall certify that to the best of their knowledge no such product exists, has been patented, or is patent pending. Proposals without such certifications will not be considered.**

**PIPELINE AND HAZARDOUS MATERIALS SAFETY ADMINISTRATION 4 AWARDS****07-PH1 Pipeline Safety**

America receives over two-thirds of the crude and petroleum products for more than 55 million residential and commercial customers, through more than 160,000 miles of pipelines (based on year 2004 liquid pipeline operator national mileage information). In addition, over 326,000 miles of gas transmission pipeline transports natural gas to local companies that distribute it to local customers. This supply of energy has too often been disrupted by internal corrosion resulting in pipeline leaks. Future energy demands are projected to be met with increase usage of higher strength pipeline steels and LNG to supplement the supply of natural gas.

For Pipeline Safety, research is sought on the use of innovative tools or concepts that allowed for pipeline detection of internal corrosion in liquid and or natural gas applications, soft crack arrestors for high strength pipeline steels, and risk Protocol for LNG Facilities. Areas of interest include but are not limited to:

1. Nanotechnology tools for Internal Corrosion of Pipelines

Nanotechnology is the understanding and control of matter at dimensions of roughly 1 to 100 nanometers, where unique phenomena enable novel applications. Encompassing nanoscale science, engineering, and technology, nanotechnology involves imaging, measuring, modeling, and manipulating matter at this length scale. Nanotechnology is advancing rapidly in several other technology applications.

Determining the presence and corrosivity of water is an important component of Internal Corrosion Direct Assessment (ICDA) in the pipeline industry. Current available technologies are limited because some cannot be applied to all pipelines and others require prior knowledge of where to locate the sensors and costly pipeline excavations to replace the sensors. Applications are sought for new nanotechnologies for detection and elimination of internal corrosive compounds, and for providing assessment information that could compare product

composition. Anticipated results would prove quantifiable and reliable improvements in ICDA. Applications are sought to study, develop, and demonstrate nanotechnologies or techniques to better detect pipeline internal corrosion.

## 2. Development of Risk Protocol for LNG Facilities

Recent studies have indicated that a risk-based assessment of potential hazards from LNG facilities may provide a better description of public safety than the current prescriptive approach. Therefore, there is a need to develop appropriate risk protocol for considering the spectrum of events in an LNG facility and their effects on the public. Areas of interest include a spectrum of potential fires in a LNG facility, variability in radiant heat emission characteristics of fires of different sizes, radiative heat effects on people with considerations of radiant heat absorption in the atmosphere and the anatomy/heat absorption characteristics of exposed human skin, etc. However, there are other phenomena that need to be considered in a proper risk assessment.

Applications are sought to study all known information on the types of events/phenomena that can occur in a LNG facility, assessment of their frequencies of occurrence, mathematical models that can be used to describe the effects of hazardous events, and criteria for acceptability of risks. A risk assessment protocol development is the objective of such a study. Carry-on task could include risk assessment protocols converted into a user-friendly computer model for use by regulatory agencies and others evaluating public risks from LNG facilities.

## 3. Design Optimization for Soft Crack Arrestors

For high-energy pipelines (rich natural gas, CO<sub>2</sub>, etc.), there is a potential for unstable ductile fractures that could run long distances unless there is sufficient toughness or a mechanical crack arrestor is used. Higher grade steels used in new pipeline projects may not have enough toughness to arrest a crack; hence mechanical crack arrestors would be needed. Mechanical crack arrestors are full-encirclement sleeves that can be made from steel or composite materials. Up to now, their design is based solely on the strength of the arrestor so it stops the crack without breaking the arrestor. However, if the arrestor is too stiff, then as the axial crack approaches the arrestor, the loads are taken by the front edge of the arrestor. This results in the axial crack turning in the circumferential direction and causing a complete circumferential break in the pipe, called a “ring-off” or a “hard arrest.”

Soft Crack Arrestors are a design concept that prevents axial ductile fractures from propagating, while keeping the pipe safely in the ditch after the arrest event. This behavior is desirable from a damage prevention viewpoint to surrounding buildings, structures, and above-ground pipelines in or close to the right of way of the pipeline.

Application are sought to conduct feasibility laboratory-scale tests to assess the ductility and strength of new candidate materials for use as soft crack arrestors. Future work could include designing, fabricating, and conducting large-diameter full-scale tests to validate the material selection for the Soft Crack Arrestor design. The full-scale tests should have the arrestors at the temperature corresponding to operating conditions. A final design specification procedure needs to be established, as well as fabrication and installation procedures.

## **07-PH2 Hazardous Materials**

Hazardous materials are essential to the economy of the United States and the well-being of its people. Hazardous materials fuel automobiles, heat and cool homes and offices, purify water supplies, and are



used for farming and medical applications and in manufacturing, mining, and other industrial processes. More than three billion tons of regulated hazardous materials—including explosive, poisonous, corrosive, flammable, and radioactive materials—are transported in this country each year. There are over 800,000 daily shipments of hazardous materials moving by plane, train, truck, or vessel in quantities ranging from ounces to thousands of gallons.

#### 1. Emerging Technologies Applicable to Hazardous Materials Transportation

For hazardous materials, research is sought on emerging technologies that have potential application in improving hazardous materials transportation safety and security. A number of these technologies are in varying stages of development. They range from tracking systems to large vehicle electronic stability control systems to non-destructive evaluation techniques to technologies capable of detecting undeclared hazardous materials.

Applications are sought for surveying technologies that can potentially improve hazardous materials transportation safety and security over a five to ten year horizon. They can also focus on a specific technology that holds promise in improving hazardous materials safety and security in the near term. A roadmap of technologies by purpose, mode of transportation, and hazardous material type may also be beneficial. Research could highlight the potential role technology or technologies can play as well as impediments to their successful adoption and steps that should be taken in advancing the technologies.

## **NATIONAL HIGHWAY AND TRAFFIC SAFETY ADMINISTRATION**

## **2 AWARDS**

### **<sup>5</sup>07-NH1 Development of Consolidated Six-Degree-of-Freedom Kinematics Sensor Array for Impact Testing**

The development of sensor technology to improve occupant and vehicle kinematics measurement during impact events will provide researchers with improved data for the evaluation of occupant response and vehicle crashworthiness. Although currently available off-the-shelf sensors can be incorporated into a package capable of measuring dynamic six-degree-of-freedom (6DOF) kinematics, the complexity of use and questionable accuracy highlight the need for improved technology. Data gathered from linear accelerometers and angular rate/acceleration sensors has been shown to produce reasonably accurate trajectory data of individual rigid bodies over short time periods, but accumulation of error (from sensor drift and numerical integration) tend to skew the results for longer time ranges and relative segment motions. Film analysis is an alternative way of measuring occupant kinematics, but is often limited by the inability of the cameras to track targets throughout the entire period of interest and the calculation of full 6DOF kinematics requires numerous cameras and multiple targets on each rigid body. A sensor-based methodology, capable of measuring and calculating 6DOF kinematics in vehicular-type impact settings, is thus warranted.

Upon development of suitable sensor hardware, the device should be tested in dynamic test configurations that are representative of typical vehicle crashes and pedestrian impacts. The sensor array should be capable of measuring occupant (dummy or post-mortem human surrogate), pedestrian (dummy or post-mortem human surrogate), and vehicle kinematics. Multiple sensor arrays could be mounted within each system to provide segment relative motion for an occupant or structural deformation for a vehicle.

The required features of the end-product include:

- Compact, ruggedized, and hermetically sealed housing to contain the sensing elements
- Single (six channels per) or double (three channels per) cable as dictated by electrical noise requirements

- Mounting holes for direct attachment to existing dummy components (spacing and orientation consistent with 7264 triax cube)
- Mass less than 35 grams (not including cabling)
- Overall length, width, and height of housing less than 25 mm each
- Markers/dots on sensor housing to facilitate calculation of initial position and orientation by digitizing with coordinate measurement device (minimum of three points; small indentations for CMD probe allow for more precise measurements)
- Three orthogonally-mounted linear acceleration-sensing elements with  $\pm 2000$  g peak response,  $\pm 1\%$  maximum non-linearity and hysteresis, 3% maximum transverse sensitivity
- Three orthogonally-mounted angular velocity-or acceleration-sensing elements with  $\pm 12,000$  deg/s peak response ( $\pm 200$  rad/s) or  $\pm 2.3E6$  deg/s<sup>2</sup> (40,000 rad/s<sup>2</sup>),  $\pm 1\%$  maximum non-linearity and hysteresis, 2% maximum cross-axis sensitivity,
- Sensor x-, y-, and z-axes configured according to right-hand rule
- On-board bridge circuitry
- Operating range  $-20^{\circ}$  C to  $80^{\circ}$  C
- 10V excitation voltage
- Bandwidth DC to 1500 Hz
- Data processing routines to translate raw sensor data to actual 6DOF kinematics data in the laboratory reference frame with  $<5\%$  spatial and angular error in typical occupant or pedestrian crash event
- Data processing routines to translate raw sensor data from multiple sensor arrays to relative 6DOF kinematics in local segment reference frames (e.g. relative rotation of head with respect to torso)

Desired features include:

- Ability of device to self-determine initial position and orientation relative to some global (laboratory) reference frame
- Mass less than 20 grams (not including cabling)
- Overall length, width, and height of housing less than 15 mm each
- Self-contained power supply and flash memory with wireless connection to data acquisition and triggering system

#### **507-NH2 Non-contact Roof Measurement System for Use in Dynamic Rollover Testing**

Roof deformation during rollover crashes and its relationship to occupant safety has been the subject of considerable safety discussion. To date there has only been limited testing to record the dynamic response of the roof structure. What testing has been done has relied on tri-axial accelerometers, string potentiometers, and high speed film analysis to characterize the roof deformation during full vehicle rollover testing. None of these systems are capable of measuring the three dimensional motion of a grid of data points on the vehicle roof.

Desired is the development of a non-contact, possibly optical system to measure the dynamic motion of a vehicle roof, relative to a point on the vehicle cabin floor, for a grid of points on the roof. The measurement system must have a displacement accuracy of at least 1 mm and velocity accuracy of 0.1 km/h. An acceptable system should be able to operate in a typical vehicle rollover environment, up to 30 G's multi axis acceleration. A measurement system should interface with standard data acquisition equipment and triggering systems. Acceptable proposals can assume that the vehicle seats have been removed for the rollover tests, but measurements systems that could work in the presence of seats and crash dummies would be a significant benefit.

**‘07-FT1 Linear Induction Motors (LIM) Door Closer for Rapid Rail Vehicles**

Dependable, swift, silent, energy-efficient door closure for transit railcars is essential to smooth operation and fast, safe exit and entrance of passengers. Linear induction motors (LIMs) are used to move heavy stage curtains and draperies. Adapting a LIM to opening and closing railcar doors would entail a reduction in space required for the actuating mechanism as well as more responsive acceleration and deceleration when passengers or their belongings block the door from closing.

**‘07-FT2 Hybrid Propulsion for Rail Locomotives**

Reduce energy consumption and emissions from diesel locomotives through hybrid propulsion, using either hydraulic energy storage systems or electric drives and batteries.

**‘07-FT3 Methods for Upgrading Existing Automatic Train Control (ATC) Systems**

Develop and test methods for modifying existing ATC systems to improve ride quality, energy conservation, safety or operational performance. Technology upgrades could involve train location sensors and techniques, communication systems, central control algorithms, speed profiles, motor controllers, and other train controls.

**‘07-FT4 Very High Speed Third Rail Insulator Cleaning**

The third rail carries electricity, some 600 to 1,000 volts, that powers rail rapid transit systems. It sits on insulators typically spaced about six to ten feet apart, which means there may be hundreds of thousands of insulators in a system. Dirt and grime can short-circuit an insulator, which can cause electrical arcing, potential fire, smoke damage, explosive breaking, and other consequences that result in the need to shut down train operations. Rail rapid transit systems around the country report that damaged insulators are most frequently the cause of traction power system shut-down.

It is virtually impossible to clean the side of insulators that are only a few inches from tunnel walls. Tunnels are often damp from water leaks, causing corrosion and rust. There is no rain to wash away soot and other particulates. These conditions accelerate insulator failure. Another complication is that the thousands of insulators on a given transit system may vary in size, shape, and material. The dirt itself varies in kind, from carbon dust, metal filings, and rust particles from the third rail/paddle and steel wheel/rail interface to greasy grime, corrosion, and soot. Chemical cleaning agents are disallowed because of environmental and worker health considerations. Another issue is that the water used for cleaning must be transported to a site using a high rail or on-rail vehicle, and the quality of cleaning and number of insulators cleaned is limited by the amount of water that can be transported.

Current cleaning methods are expensive, of limited effectiveness, and rarely used. They involve hand brushes, cleaning pads, or pressure washing with a hand-held wand. But if not cleaned regularly, insulators must be replaced, at even greater expense. This does not address the costs of system down-time when smoke or fire result from damaged insulators. In addition to lost revenue, there are costs to riders in lost time and lost confidence in the system's reliability.

A promising project developed by the TRB Transit IDEA program is a slow-speed prototype automated cleaner that cleans all sides of an insulator with four spray jets. This cleaner is described on pages four and five of the TRB magazine, *IGNITION*, at the website <http://www.trb.org/studies/programs/idea.asp> (click on *Transit IDEA*, click on *Transit IDEA Annual Progress Report*, page 58 *Project T36 Cleaning Device for Electrified Third Rail Insulators*). Work was done in cooperation with a number of rail rapid transit agencies in developing and testing the

prototype cleaner. A second Transit IDEA project is in development to produce a faster cleaning device. Initial comments from transit agencies indicate that this cleaner uses too much water and is still not fast enough because of limited non-revenue hours or 24/7/365 operation. A solution would be development of a very high speed insulator cleaner that uses a minimal amount of water to improve reliability and safety of rail rapid transit systems.

#### **607-FT5 Better/Faster Braking Systems**

Apply advanced mechanical, electrical, and computer control technologies to braking for rapid rail transit and light rail transit trucks, commuter rail locomotives, and unpowered passenger railcars. Technical objectives are faster response to braking signals, quicker stops with reduced stopping distance, smoother braking for improved ride quality, and energy conservation.

### **FEDERAL RAILROAD ADMINISTRATION**

### **3 AWARDS**

#### **707-FR1 Locking Mechanism for Rotating Seats**

The NTSB has identified inter-city rail passenger seats which have rotated out of position as a potential impediment to emergency egress, after an accident. FRA research has indicated that such seats are prone to rotating after a car has rolled onto its side, which can occur subsequent to a derailment. The lateral impact can cause the spring-loaded locking mechanism to open, and the associated lateral force acting on the seat can initiate rotation. The objective of this effort is to develop a simple, inexpensive locking mechanism that can be retrofit onto existing inter-city passenger seats which remains locked during rail passenger car rollovers and prevents initiation of the rotation of such seats. The contractor shall conduct a survey of existing applicable technology and document the information in a letter report. The contractor shall then develop a set of design requirements for a robust independent locking mechanism that accomplishes the goals defined above. A preliminary proof of concept design shall be developed and demonstrated. The information generated in the course of this project shall be summarized and presented in a public forum at the discretion of the Government. The contractor shall also develop a final report describing the methodology and approach used to develop the technology.

#### **707-FR2 Quick-release Emergency Egress Panel on Cab Car End Doors**

The NTSB has identified end door kick panels as a potential mechanism for emergency egress of passengers subsequent to a train accident. There is industry concern that such kick panels may interfere with other door requirements (e.g., sliding of pocket doors, preventing fluid ingress during a grade-crossing accident for a cab car end door, et al) and that such kick panels will be a nuisance to maintain. The objectives of this effort are to enumerate the design requirements, including the maintenance requirements, for cab car and coach car end doors, suggest alternative engineering design approaches for kick panels in cab and coach car end doors, and to assess preliminarily the potential effectiveness of these alternative strategies. The FRA is particularly interested in kick panels which have similar release mechanism as emergency access windows. The information generated in the course of this project shall be summarized and presented in a public forum at the discretion of the Government. The contractor shall also develop a final report describing the methodology and approach used to develop the technology.

#### **707-FR3 Continued Communication Capability in the Event of a Train-line Break in a Passenger Train**

In the event of an emergency or an unusual occurrence in which the communication train-line circuit is broken, passenger rail vehicles equipped with public address (PA)/intercom systems lose the capability for communications throughout the entire train. A member(s) of the train crew are best suited and trained to assess the severity of an event and determine an appropriate course of action.

Communication with passengers by someone so qualified is the most effective method to reduce confusion and curtail panic. Such communications help avoid circumstances which could result in injuries or further danger to passenger and crew. Therefore it is desirable to equip passenger rail vehicles with a system to insure that such a communication system exists. The purpose of this project is to develop a backup PA system that is effective in the event of a break/interruption in the communication train-line; has a power source independent of the car battery system and allows for a minimum of one hour “talk time” after the loss of the train-line; and is accessible to the crew through the use of a train radio or a radio handset. The contractor shall conduct a survey of existing applicable technology and document the information in a letter report. The contractor shall then develop a set of design requirements for a robust independent PA system that accomplishes the goals defined above. A preliminary proof of concept design shall be developed and demonstrated. The information generated in the course of this project shall be summarized and presented in a public forum at the discretion of the Government. The contractor shall also develop a final report describing the methodology and approach used to develop the technology.

## **IX. SUBMISSION FORMS AND CERTIFICATIONS**

- |    |                               |            |
|----|-------------------------------|------------|
| 1. | PROPOSAL COVER SHEET          | Appendix A |
| 2. | PROJECT SUMMARY               | Appendix B |
| 3. | CONTRACT PRICING PROPOSAL     | Appendix C |
| 4. | PROPOSAL CHECKLIST            | Appendix D |
| 5. | PROPOSAL ACKNOWLEDGEMENT FORM | Appendix E |

**U.S. DEPARTMENT OF TRANSPORTATION  
SMALL BUSINESS INNOVATION RESEARCH PROGRAM  
SOLICITATION NO. DTRT57-07-R-SBIR**

**PROPOSAL COVER SHEET**

Project Title \_\_\_\_\_

Research Topic No. \_\_\_\_\_ Research Topic Title \_\_\_\_\_

Submitted by: Name \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_ Zip + \_\_\_\_\_

Amount Requested (Phase I) \$ \_\_\_\_\_  
(May be up to \$100,000 unless otherwise indicated)

Proposed Duration \_\_\_\_\_  
(in months) (Not to exceed six months)

1. The above concern certifies it is a small business firm and meets the definition stated in Section II.B; and that it meets the eligibility requirement in Section I.C. Yes \_\_\_\_\_ No \_\_\_\_\_
2. The above concern certifies it \_\_\_\_\_does\_\_\_\_\_does not qualify as a socially or economically disadvantaged small business as defined in Section II.C. (For statistical purposes only.)
3. The above concern certifies it \_\_\_\_\_does\_\_\_\_\_does not qualify as a women-owned small business as defined in Section II.D. (For statistical purposes only.)
4. This firm and/or Principal Investigator has submitted proposals containing a significant amount of essentially equivalent work under other federal program solicitations, or has received other federal awards containing a significant amount of essentially equivalent work. (If yes, identify proposals in the Section III. D.10. "Similar Proposals or Awards".) Yes \_\_\_\_\_ No \_\_\_\_\_
5. Will you permit the Government to disclose the title and technical abstract of your proposed project, plus the name, address, and telephone number of the Corporate/Business Official and Principal Investigator of your firm, if your proposal does not result in an award, to any party that may be interested in contacting you for further information? Yes \_\_\_\_\_ No \_\_\_\_\_
6. Do you qualify as a HUBZone-owned and meet the definition as stated in this Section II. F (For statistical purposes only) Yes \_\_\_\_\_ No \_\_\_\_\_

Principal Investigator  
Name \_\_\_\_\_  
Title \_\_\_\_\_  
Signature \_\_\_\_\_ Date \_\_\_\_\_  
Telephone No. \_\_\_\_\_

Corporate/Business Official  
Name \_\_\_\_\_  
Title \_\_\_\_\_  
Signature \_\_\_\_\_ Date \_\_\_\_\_  
Telephone No. \_\_\_\_\_

**PROPRIETARY NOTICE (IF APPLICABLE, SEE SECTION V.D.1)**

**U.S. DEPARTMENT OF TRANSPORTATION  
SMALL BUSINESS INNOVATION RESEARCH PROGRAM  
SOLICITATION NO. DTRT57-07-R-SBIR**

**PROJECT SUMMARY**

Name and Address of Offeror	FOR DOT USE ONLY
	Proposal No.

Name and Title of Principal Investigator

Project Title

Research Topic No.	Research Topic Title
--------------------	----------------------

Technical Abstract (Limited to two hundred words in this space only with no classified or proprietary information/data).

Anticipated Results/Potential Commercial Applications of Results.

Provide key words (eight maximum) description of the project useful in identifying the technology, research thrust, and/or potential commercial application.



**U.S. DEPARTMENT OF TRANSPORTATION  
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**APPENDIX C  
(SCHEDULE 1)**

**CONTRACT PRICING PROPOSAL**

<b>PROPOSAL COVER SHEET</b>				1. SOLICITATION/CONTRACT/MODIFICATION NUMBER			
2a. NAME OF OFFEROR				3a. NAME OF OFFEROR'S POINT OF CONTACT			
2b. FIRST LINE ADDRESS				3b. TITLE OF OFFEROR'S POINT OF CONTACT			
2c. STREET ADDRESS				3c. TELEPHONE		3c. FACSIMILE	
2d. CITY	2e. STATE	2f. ZIP CODE		AREA CODE	NUMBER	AREA CODE	NUMBER
4. TYPE OF CONTRACT OR SUBCONTRACT ( <i>Check</i> ) <input checked="" type="checkbox"/> FFP <input type="checkbox"/> CPFF <input type="checkbox"/> CPIF <input type="checkbox"/> CPAF <input type="checkbox"/> FPI <input type="checkbox"/> OTHER ( <i>Specify</i> )				5. <input type="checkbox"/> PRIME OFFEROR <input type="checkbox"/> SUBCONTRACTOR _____ <div style="text-align: right;">PRIME OFFEROR'S NAME</div>			
6. ESTIMATED COST, FEE, AND PROFIT INFORMATION							
A. ESTIMATED COST							
B. PROFIT							
C. TOTAL PRICE							
7. PROVIDE THE FOLLOWING							
NAME OF COGNIZANT CONTRACT ADMINISTRATIVE AGENCY				NAME OF COGNIZANT GOVERNMENT AUDIT AGENCY			
STREET ADDRESS				STREET ADDRESS			
CITY		STATE	ZIP CODE	CITY		STATE	ZIP CODE
TELEPHONE	AREA CODE	NUMBER		TELEPHONE	AREA CODE	NUMBER	
FACSIMILE	AREA CODE	NUMBER		FACSIMILE	AREA CODE	NUMBER	
NAME OF CONTACT				NAME OF CONTACT			
PROPERTY SYSTEM <input type="checkbox"/> Reviewed by cognizant contract administrative agency and determined acceptable <input type="checkbox"/> Reviewed by cognizant contract administrative agency and determined not acceptable <input type="checkbox"/> Never reviewed				APPROXIMATE DATE OF LAST AUDIT			
				PURPOSE OF AUDIT  (e.g. proposal review, establishment of billing rates, finalize indirect rates, etc.)			
PURCHASING SYSTEM <input type="checkbox"/> Reviewed by cognizant contract administrative agency and determined acceptable <input type="checkbox"/> Reviewed by cognizant contract administrative agency and determined not acceptable <input type="checkbox"/> Never reviewed				ACCOUNTING SYSTEM <input type="checkbox"/> Audited and determined acceptable <input type="checkbox"/> Audited and determined not acceptable <input type="checkbox"/> Never audited			
				OFFEROR'S FISCAL YEAR			
8a. NAME OF OFFEROR ( <i>Typed</i> )				9. NAME OF FIRM			
8b. TITLE OF OFFEROR ( <i>Typed</i> )							
10. SIGNATURE					11. DATE OF SUBMISSION		

**U.S. DEPARTMENT OF TRANSPORTATION  
SMALL BUSINESS INNOVATION RESEARCH PROGRAM  
CONTRACT PRICING PROPOSAL**

**Background**

The following items, as appropriate, should be included in proposals responsive to this Solicitation.

**Cost Breakdown Items** (in this order, as appropriate) (See Section III.E)

1. Name of offeror
2. Address of offeror
3. Location where work will be performed
4. Offeror's Project Title
5. Research topic number and title from DOT SBIR Program Solicitation
6. Total dollar amount of the proposal (dollars)
7. Direct material costs
  - a. Purchased parts (dollars)
  - b. Subcontracted items (dollars)
  - c. Other
    - (1) Raw materials (dollars)
    - (2) Standard commercial items (dollars)
  - d. Total direct materials (dollars)
8. Material overhead rate \_\_\_\_\_ % x total direct material = dollars
9. Direct labor (specify)
  - a. Type of labor, estimated hours, rate per hour, and dollar cost for each type
  - b. Total estimated direct labor (dollars)
10. Labor overhead
  - a. Identify overhead rate, the hour base, and dollar cost
  - b. Total estimated labor overhead (dollars)
11. Special testing (include field work at Government installations)
  - a. Specify each item of special testing, including estimated usage and unit cost
  - b. Estimated total special testing (dollars)
12. Other special equipment
  - a. If direct charge, specify each item of special equipment, including usage and unit cost
  - b. Estimated total other special equipment (dollars)

## APPENDIX C Continued

13. Travel (if direct charge)
  - a. Transportation (detailed breakdown and dollars)
  - b. Per diem or subsistence (details and dollars)
  - c. Estimated total travel (dollars)
14. Consultants Service
  - a. Identify each consultant, including purpose and dollar rates
  - b. Total estimated consultant service costs (dollars)
15. Other direct costs (specify)
  - a. Total estimated direct cost and overhead (dollars)
16. General and administrative expense
  - a. Percentage rate applied
  - b. Total estimated cost of G&A expense (dollars)
17. Royalties (specify)
  - a. Estimated cost (dollars)
18. Profit (dollars)
19. Total estimated cost and profit (dollars)
20. The cost breakdown portion of a proposal must be signed by a responsible official of the firm (include typed name and title and date of signature)
21. Provide a yes or no answer to each of the following questions:
  - a. Has any executive agency of the United States Government performed any review of your accounts or records in connection with any other Government prime contract or subcontract within the past twelve months? If yes, provide the name and address of the reviewing office, name of the individual and telephone/extension.
  - b. Will you require the use of any Government property in the performance of this proposal? If yes, identify.
  - c. Do you require Government contract financing to perform this proposed contract? If yes, specify type as advanced payments or progress payments.
22. Type of contract proposed is, firm-fixed price
23. DUNS number, if available \_\_\_\_\_  
(See Section III.F)
24. Tax Identification Number, if available

**U.S. DEPARTMENT OF TRANSPORTATION  
SMALL BUSINESS INNOVATION RESEARCH PROGRAM  
SOLICITATION NO. DTRT57-07-R-SBIR**

**PROPOSAL CHECKLIST**

This is a CHECKLIST OF REQUIREMENTS for your proposal. Please review the checklist carefully to assure that your proposal meets the DOT SBIR requirements. Failure to meet these requirements may result in your proposal being returned without consideration. (See Sections III and IV.C of this Solicitation). **Do not include this checklist with your proposal.**

- \_\_\_\_\_ 1. The proposal reflects the fact that for Phase I a minimum of two-thirds (and for Phase II a minimum of one-half) of the research and/or analytical effort will be performed by the proposing firm as required (see Sections V.H.1 and V.H.2) and the primary employment of the principal investigator (for both Phase I and Phase II) must be with the small business firm at the time of award and during the conduct of the proposed research as required (see Section I.C).
- \_\_\_\_\_ 2. The proposal is 25 PAGES OR LESS in length. This limitation does not apply to the additional information required by Section III.H.
- \_\_\_\_\_ 3. The proposal is limited to only ONE of the research topics in Section VIII.
- \_\_\_\_\_ 4. The proposal budget may be up to \$100,000 unless otherwise indicated and duration does not exceed six months.
- \_\_\_\_\_ 5. The technical abstract contains no proprietary information, does not exceed 200 words, and is limited to the space provided on the Project Summary sheet (Appendix B).
- \_\_\_\_\_ 6. The proposal contains no type smaller than ten point font size.
- \_\_\_\_\_ 7. The COVER SHEET (Appendix A) has been completed and is PAGE one of the proposal.
- \_\_\_\_\_ 8. The PROJECT SUMMARY (Appendix B) has been completed and is PAGE two of the proposal.
- \_\_\_\_\_ 9. The TECHNICAL CONTENT of the proposal begins on PAGE three and includes the items identified in SECTION III.D of the Solicitation.
- \_\_\_\_\_ 10. The Contract Pricing Proposal (Appendix C) has been included as the last section of the proposal.
- \_\_\_\_\_ 11. The acknowledgement of proposal receipt card (Appendix E) should be filled out and included with the proposal package.
- \_\_\_\_\_ 12. The additional information on prior Phase II awards, if required, in accordance with Section III.H.
- \_\_\_\_\_ 13. The proposal must be received by May 1, 2007.

**APPENDIX E**

**DOT SBIR PROGRAM SOLICITATION  
DTRT57-07-R-SBIR**

TO BE FILLED OUT BY THE OFFEROR:

Project Title \_\_\_\_\_  
\_\_\_\_\_

TO BE FILLED OUT BY THE DEPARTMENT OF TRANSPORTATION:

Date Received \_\_\_\_\_ Proposal No. \_\_\_\_\_